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(54) Title: VIRTUALIZED COMPUTER TELEPHONY INTEGRATED LINK FOR ENHANCED FUNCTIONALITY

(57) Abstract

An agent station for a call-in center has a telephone for an agent's use connected by a communication link with a computer workstation adpated for monitoring transaction and status for the telephone and calls received on the telephone. In a preferred embodiment the computer workstation is connected on a local area network (LAN) to a processor running and instance of a telephony server (T-Server) application, and the computer workstation reports telephone transaction and status data to the T-Server, which uses the data to effect call routing at a remote telephony switch. In some embodiments the computer workstations are personal computers (PCs) and the communication link between telephones and PCs is a PC-compatible serial data link.

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Virtualized Computer Telephony
Integrated Link for Enhanced Functionality

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Field of the Invention

10   The present invention is in the area of telephone call processing
and switching, and pertains more particularly to intelligent call-routing
systems with Computer Telephony Integration (CTI).

Cross-Reference to Related Applications

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The present patent application is related to copending patent
applications 08/797,406; 08/797,407; 08/797,408; 08/797,417;
08/797,418; 08/797,419; and 08/797,420, which applications each have
a common inventor to the present application and are incorporated
20   herein in their entirety by reference.

Background of the Invention

At the time of filing the present patent application there
25   continues to be remarkable growth in telephone-based information
systems. Recently emerging examples are telemarketing operations and
technical support operations, among many others, which have grown
apace with development and marketing of, for example, sophisticated
computer equipment. More traditional are systems for serving
30   customers of such as large insurance organizations. In some cases
organizations develop and maintain their own telephony operations with
purchased or leased equipment, and in many other cases, companies are
outsourcing such operations to firms that specialize in such services.

A relatively small technical support operation serves as an
example in this specification of the kind of applications of telephone
equipment and functions to which the present invention pertains and
applies. Consider such a system having just one, or at most a few call-in
centers, as opposed to a large organization having country-wide matrix
of call-in centers. One of the differences that might be noticed in this
example is that such a relatively small operation will be less likely to
have an on-premises telephony switch, and would thus rely on an off-
premises switch. In the patent applications listed above as related to the
present application call-in centers were described having a telephony
switch as a part of the Customer Premises Equipment (CPE), and
inventions are taught and claimed in those applications related to such
relatively large-scale systems. In the present application an invention in
various aspects is taught and claimed relative to call-in centers having no
telephony switch as a part of the CPE.

It is generally known in the art to provide computer functions as
a part of telephone switching equipment, although there are many
inventions that have been patented relative to such functionality, and
there are many patent applications pending related to such equipment,
including the pending applications listed above. It is also known in
some later technical development to integrate computers with telephony
switches, and several such applications are known to the inventors and
are disclosed and taught in the related patent applications to which
reference has been made. Such computer enhancement is known in the
art as Computer Telephone Integration (CTI), and is in the realm of CTI
that the present invention also applies in a broad sense.

Very broadly speaking, it is desirable in the art wherever call-in
centers are operated to provide quick and efficient service to callers
(although this may not be always readily apparent to the callers, who
still in most such systems find themselves stuck on hold in queues for
long periods). There is nevertheless much inventive work being done to
enhance and improved such systems, and much of this development is in

the area of CTI, as might be expected. It is in this area that the present

invention applies, and it is an object of the present invention to provide

enhanced CTI functionality for call-in centers having no telephony

switch as a part of the CPE, wherein calls are routed to telephones at

5   such a call-in center by one or more telephony switches not a part of the

CPE.

Summary of the Invention

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In a preferred embodiment of the present invention an agent

station for a telephony call-in center is provided, comprising a computer

workstation having a first communication port and a local area network

(LAN) adapter; a telephone having a telephone line port and a second

15   communication port; and a communication link connecting the computer

workstation and the telephone between the first and the second

communication ports. The computer workstation is adapted to monitor

transactions and status of the connected telephone via the

communication link, and to report the transaction and status on a LAN

20   via the LAN adapter. The computer workstations may be personal

computers (PCs) in some embodiments, and the communication link

between the PCs and the telephones may be PC-compatible serial data

links.

In an aspect of the invention a telephony call-in center is

25   provided, comprising a plurality of agent stations as described above,

with individual ones of the computer workstations connected on the

LAN to a first computer processor including an instance of a telephony

server (T-Server), the computer processor having also a long-distance

network port adapted to connect to a remote computer processor to

30   report the transactional and status data collected from the local computer

workstations, thereby providing computer-telephony integration (CTI)

information typically collected from a telephony switch.

In the call-center aspect, the computer workstations are further adapted to retrieve call-origin data from incoming calls and to use this data to retrieve other data associated with callers from a caller database connected on the LAN, and to display the retrieved data on video display

5   units (VDUs) during the time that an agent is speaking with a caller.

In other aspects of the invention call-routing systems are provided including call-in centers having agent stations as described above, and status and transaction data collected is integrated by the T-Server into CTI data which is shared with remote processors, and used

10   also to command remote telephony switches to route calls. In yet other aspects methods for providing CTI data for various purposes are provided.

Brief Description of the Drawing Figures

15

Fig. 1 is a block diagram of a call-routing system in the prior art.

Fig. 2 is a block diagram of a call-routing and call-in system according to embodiments of inventions known to the present inventors.

Fig. 3 is a block diagram of a call and information routing and

20   call-center system according to an embodiment of the present invention.

Description of the Preferred Embodiments

To help create a context for a detailed description of preferred

25   embodiments of the present invention, attention is first directed to Fig. 1, which is a block diagram of a call-routing system in the prior art. In the system of Fig.1 a call-in center 150 is illustrated having two telephones 162 and 172. As was described above in the background section, the present invention is particularly adaptable to such call-in centers wherein

30   a telephony switch is not a part of the equipment at the call-in center, thus no telephony switch is shown in Fig. 1 at call-in center 150.

It will be apparent to those with skill in the art that there may be just one phone in call-in center, or there may be several more than the two shown. Two telephones is an arbitrary choice for purposes of illustration and description.

5   It is common and desirable at call-in centers for agents who man the phones to have at hand a personal computer (PC) or a data terminal of some description including a video display and processor. Access to such a computerized system allows the agent to recall and display data pertaining to a caller, and also other information of use in dealing with

10   and helping caller, such as technical information about products and product use. Although several types of such data terminals are known, PCs are assumed here for purposes of description and illustration. A PC 161 with a display is shown at hand for an agent using telephone 162 and a PC 171 is shown proximate telephone 172 for use by an agent at

15   telephone 172.

In a very simple system there may be just one telephone and one PC proximate the telephone, therefore just a single equipped agent constituting the call-in center. In the system of Fig. 1 having two telephones, there are also two PCs. Each PC and associated telephone is

20   considered here to constitute an agent station. Agent station 160 comprises telephone 162 and PC 161, and agent-station 170 comprises telephone 172 and PC 171.

In systems of the sort depicted by Fig. 1, having two or more agent stations, it is desirable that the PCs be connected in a Local Area

25   Network (LAN), and this connectivity is shown in Fig. 1 with PCs 161 and 171 connected on a LAN 152 wherein a data file server 153 is also connected. Data file server 153 in this system is the repository of customer data and the like accessible to agents manning the phones. Though not shown in Fig. 1 it will be apparent to those with skill in the

30   art that there may be other servers on the LAN or elsewhere in the network as known in the art.

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Telephone calls in the system of Fig. 1 are provided to telephone
162 on line 164 and to telephone 172 on line 174 from essentially
anywhere represented by network cloud 100. Cloud 100 could represent
a relatively small local calling area, a regional area, a single phone
5   company or even the phone system of the entire planet. Calls are
forwarded by telephony switches represented by telephony switch 120.

Calls 104 intended specifically for call-in center 150 typically are
received at Service Control Points (SCP) represented by SCP 102, which
are organized typically with one or more 800 numbers or the like. Calls
10   received and processed at SCP 102 are forwarded to switch 120 which
routes the calls to whatever area code and number is assigned to
telephones 162 and 172. Other calls 122 may also come into telephony
switch 120 and be routed to call-in center150. As is known in the art,
SCP 102 is also a telephony switch.

15   Also as is known in the art, there may be equipment associated
with SCP 102 to provided some additional functionality, such as an
adjunct processor and an intelligent peripheral. For simplicity's sake
these are not shown in Fig. 1., but Fig. 1 may be considered as typical of
many prior art systems. In the rather simple system of the prior art
20   represented by Fig. 1 some data (such as caller ID for example, , and
Dialed Number Information Service {DNIS}), may be associated with
calls forwarded to call-in center 150. Such data to be useful in the
system of Fig. 1 must be received by specialized equipment, such as
familiar caller-ID boxes or telephone sets adapted to use the information
25   being sold to people for home and business use.

Attention is now directed to Fig. 2, wherein a call-in system
known to the present inventors is illustrated. In this system SCP 102
receiving calls 104 intended for call-in center 150 has a connection to an
adjunct processor 106 in communication with both an intelligent
30   peripheral 101 and a call-distribution processor 108. There is further a
processor 116 connected by a two-way communication link to call-
distribution processor 110. Processor 116 comprises an instance of a

unique application termed by the inventors a Telephony Server 114, or T-Server, and a Statistical Server (Stat-Server) 112. T-Server 114 and functions provided by the T-Server are described in detail in the related patent applications listed above and incorporated herein by reference.

5   In the system of Fig. 2 a processor 151 is provided at call-in center 150, running a second instance of T-Server application 114. Processor 151 is coupled to processor 116 in network cloud 100 by a network link 118, and to LAN 152 by a network adapter. There is in addition a CTI connection 119 between telephony switch 120 in network

10   cloud 100 and processor 151 at call-in center 150. CTI connection 119 may be an ISDN link or other data-type connection allowing transfer of CTI data and commands.

          In the system of Fig. 2 information garnered in initial processing with use of IP 101 may be provided by T-Server 114 at processor 116 to

15   T-Server 114 running on processor 151 at the call-in center. This data can be used, then, ahead of a routed call, to, for example, to extract further data regarding a caller from a customer data base in file server 153, and to provide the transferred and retrieved data at the PC display, such as PC 161, proximate the telephone to which a call has been routed,

20   for use by the agent manning that telephone.

          Further, CTI transactional data retrieved from switch 120 (line busy, line available, and the like), may be provided to T-Server 114 at processor 116, and in some cases in raw or processed form to Stat-Server 112 to be used in routing by CD processor 108. Many other

25   functions described in the related applications listed above may now also be accomplished. Still further, Stat-Server 114 running on processor 151 can issue CTI commands to switch 120 in the network cloud via CTI link 119.

          Although the system of Fig. 2 may be used to provide many CTI

30   functions, there is a great dependence on telephony switch 120. Some older switches are not capable of CTI functions and data sharing, and some others are very limited in their functions. Moreover, the

organization that provides a call-in center under these circumstances has
no control over the switches in the network cloud, and it may not be
practical for such an organization to purchase and install an expensive
CTI-capable switch on the premises of the call-in center. What is
5   needed is an apparatus and methods that will provide CTI functionality
in the absence of a workable CTI link, such as link 119 in Fig. 2.

Virtual CTI link

10   Fig. 3 is a block diagram of a call and information routing and
call-center system according to an embodiment of the present invention.
The system of Fig. 3 has all of the connectivity and functionality of the
system of Fig. 2, plus a data connection between each telephone in the
call-in center and the associated PC. For example, in Fig. 3, PC 161 is
15   connected to telephone 162 by link 163, and PC 171 is connected to
telephone 172 by data link 173. Moreover, as previously described, each
PC is connected on LAN 152, which also connects to file server 153 and
to processor 151 running an instance of T-Server 114.

There are a number of different ways a telephone and PC may be
20   connected, such as by a serial port and circuitry in the telephone and
operating code in the PC such that the PC may monitor transactions of
the telephone, including on-hook, off-hook, incoming caller-ID, ringing
instance, and so forth. The PC via the data link may also exercise
control over telephone functions. With this unique connectivity and
25   adaptation, assuming all of the telephones in a call-in center are thus
connected and adapted, T-Server 114 running on processor 151 may
acquire in aggregate all of the information otherwise available from
switch 120 via CTI connection 119. T-Server 114 on processor 151 may
then perform as though a fully workable CTI connection 119 to switch
30   120 is established.

Call and Data Correspondence

One of the important functions performed is identification of callers, retrieval of data relating to callers, and transmittal of such data to

5   be displayed at the PC associated with each telephone at each agent station. The advantage to all is readily apparent. The agent fielding a call is thus more prepared to deal with the caller, and will have information readily at hand.

To provide the call and data display functionality desired it is, of

10   course, necessary that a caller's identity be established and the caller's correct data be retrieved for display. There are some instances in the system depicted in Fig. 3 and described herein, wherein such correspondence may be a problem. Consider, for example, the circumstance wherein an original call has been routed to telephone 162.

15   The origination of the call and caller ID are not available in the system of Fig. 3 (with a non-functioning link 119) until the call is connected to telephone 162. At that point the necessary information is transferred to T-Server 114 at processor 151, and data specific to the caller may be retrieved and displayed at PC 161.

20   Consider now the further circumstance that after the agent answers and the data retrieval begins, the original caller hangs up or is otherwise disconnected, and a second call 122, a random call, entering the system not through SCP 102 but directly into switch 120, goes to telephone 162. This circumstance could occur in a number of different

25   ways, including a misdialed or misrouted call. There are also other sequences of events that could result in the same mismatch between call and data. Unless some action is taken, the data will be retrieved and displayed, although there will no correspondence between the data and the caller.

30   In this circumstance the origination information, which may be such as caller ID information or DNIS information, for the second (random) call will not indicate the call originates at SCP 102. In an

embodiment of the present invention, origination data transmitted to T-Server 114 at processor 151 indicating the call last received was not through a valid SCP will cause any data being prepared for display at the agent station to be halted. In some embodiments, depending on the

5   capability of switch 120, T-Server 114 on processor 151 may cause such non-SCP calls to be disconnected and/or rerouted, by command over link 119.

Voice Extensions Through Integrated Agent Workstations

10

The direct connection of a telephone to a PC connected on a LAN to a processor with an operating T-Server provides a platform for a number of voice extensions useful in the overall process of customer service through call-in centers. Several such voice extensions in

15   embodiments of the present invention are described herein below.

Call recording is a major need in customer service operations of the sort described herein, especially in operations dealing with financial markets and utilities. Such recording operations in current art are typically quite expensive to implement and difficult to manage. In an

20   embodiment of the present invention an improved call recording facility is provided by virtue of the connection of the telephone to the PC by data link, and the functionality afforded through LAN 152 and code as a part of T-Server 114. In this embodiment a digital voice rendition of both parties to a call is transmitted on link 163 (for example) to PC 161.

25   In one embodiment of the present invention all calls are recorded, subject of course to local laws governing such matters, and provision is made for selective archiving of recorded conversations. The recording is all digital, and may be accomplished in a number of ways, utilizing a number of commercially available hardware and software

30   entities, such as those marketed under the name SoundBlaster™. The LAN connection and availability of data servers such as server 153 provide for the rather large amount of digital data needed for such a

recording operation. In this embodiment organization of the recorded database can be done in a variety of ways, categorized by agent, by subject, by product, and so on, and relational cross-referencing may be done as well, providing a well of information not before available in

5   such call-in centers. In addition interactive search and retrieve functionality, and interactive report generation is provided. In another embodiment of the invention digital voice recording is provided on demand, under control of the resident agent and/or the agent's supervisor. It will be apparent to those with skill in the art that there are

10   many different schemes that may be employed for digital voice recording, using the uniquely connected and managed apparatus of the present invention.

In other embodiments of the present invention voice playback is provided, with pre-recorded massages played to a caller under agent or

15   Host control. Such pre-recorded messages may be recorded by an agent or other person, and stored either locally in the PC or more remotely, such as on a server connected to LAN 152. Such messages can include greetings, mandatory messages required under law in some cases, disclaimers, and all kinds of messages that may be very repetitive for an

20   agent.

In other embodiments of the present invention voice recognition routines are used allowing an agent to invoke displays with spoken initiators on the telephone, recognized in the PC and acted upon either in the PC or through the PC by means of LAN 152 by other servers on the

25   LAN or by T-Server 114. Voice recognition may also be used to detect upselling opportunities in the course of calls at PC connected telephones. Other voice recognition routines are used in embodiments of the invention to detect abusive or threatening speech, and to automatically save calls or portions of calls that match patterns for such speech.

30   It will be apparent to those with skill in the art that there are many alterations that may be made in the embodiments of the invention herein described without departing from the spirit and scope of the

invention. There are, for example, many sorts of communication links
and data protocols that may be used, such as several types of LAN
functionality, and alternative links for the telephone-to-PC links. There
are similarly many ways circuitry may be provided in a telephone to

5   accomplish the features of the present invention herein described, such
as two-way voice transmission over the telephone-PC interlink along
with transaction monitoring and reporting, as well as control of
telephone functions. The nature of the telephones used may vary
widely, and the nature of the computers at the agent workstations may

10   vary as well. There are similarly many other alterations that might be
made in embodiments described herein, while not straying from the
spirit and scope of the invention. The scope of the invention is limited
only by the claims below.

What is claimed is:

1. A telephony call-in center, comprising:

a plurality of agent stations, individual ones of the agent stations
having a telephone and a computer workstation;

a local area network (LAN) connecting at least some of the
computer workstations at the agent stations; and

a first computer processor including an instance of a telephony
server (T-Server), the computer processor connected on the LAN and
having also a long-distance network port adapted to connect to a remote
computer processor;

wherein in at least one of the agent stations the telephone is
connected to the computer workstation by a communication link,
wherein the computer workstation connected to each telephone is
adapted to accomplish one of monitoring or controlling transactions and
status of the connected telephone and to report the transaction and status
on the LAN to the T-Server, and wherein the T-server is adapted to
report information based on the transaction and status data over the long-
distance network port.

2. The telephony call-in center of claim 1 further comprising a data
server connected on the LAN, the data server comprising a caller
database, wherein individual computer workstations are adapted to
retrieve origin data from incoming calls to connected telephones, to
retrieve data associated with callers from the caller database, and to
display the data on video display units (VDUs) during time that an agent
is speaking with a caller.

3. The telephony call-in center of claim 1 wherein one or more of the
computer workstations are personal computers (PCs).

4. The telephony call-in center of claim 1 wherein the communication link between telephones and computer workstations is a PC-compatible serial data link.

5

5. A telephone call-routing system, comprising:

a call-in center comprising a plurality of agent stations, individual ones of the agent stations having a telephone and a computer workstation connected by a communication link, with a plurality of the

10   computer workstations connected to one another and to a first processor running an instance of a telephony server (T-Server) on a local area network (LAN);

a call-routing center comprising a telephony switch adapted to switch telephone calls to the telephones at the call-in center, the

15   telephony switch coupled to a second processor running an instance of the T-Server;

wherein the computer workstation connected to each telephone is adapted to accomplish one of monitoring and controlling transactions and status of the connected telephone and to report the transaction and

20   status on the LAN to the first processor running an instance of the T-Server, and wherein the first processor and second processor communicate over a long-distance network link with transaction and status data reported to the first processor being provided to the second processor to be used in call-routing decisions.

25

6. The telephone call-routing system of claim 5 further comprising a data server connected on the LAN, the data server comprising a caller database, wherein individual computer workstations are adapted to retrieve origin data from incoming calls to connected telephones, to

30   retrieve data associated with callers from the caller database, and to display the data on video display units (VDUs) during time that an agent is speaking with a caller.

7. The telephone call-routing system of claim 5 wherein one or more of the computer workstations are personal computers (PCs).

5   8. The telephone call-routing system of claim 5 wherein the communication link between telephones and computer workstations is a PC-compatible serial data link.

10   9. The telephone call-routing system of claim 5 further comprising a computer telephony integration (CTI) link between the first processor and the telephony switch.

10. An agent station for a call-in center, comprising:
15   a computer workstation having a first communication port and a local area network (LAN) adapter;
            a telephone having a telephone line port and a second communication port; and
            a communication link connecting the computer workstation and
20   the telephone between the first and the second communication ports;
            wherein the computer workstation is adapted to monitor transactions and status of the connected telephone via the communication link, and to report the transaction and status on a LAN via the LAN adapter.

25
11. The agent station of claim 10 wherein the computer workstation is a personal computer (PC) having a video display unit (VDU).

12. The agent station of claim 10 wherein the communication link is a
30   PC-compatible serial data link.

13. A method for providing transaction and status data as a basis for routing telephone calls to individual ones of telephones in a call-in center, comprising steps of:

    (a) connecting each telephone at the call-in center by a communication link to a computer workstation;

    (b) connecting each telephone-connected computer workstation on a local area network (LAN) to a processor connected on the LAN and running a telephony server (T-Server);

    (c) monitoring transactions and status of the telephones by the computer workstations;

    (d) providing the transaction and status data over the LAN to the T-Server running on the LAN-connected processor; and

    (e) furnishing the transaction and status data via a long-distance network to a remote router adapted to route calls to individual ones of the telephones at the call-in center.

14. The method of claim 13 wherein the computer workstation in step
    (a) is a personal computer (PC) and the communication link is a PC-
    compatible serial data link.

15 The method of claim 15 comprising a step for controlling functions of the telephones.

16. A telephony call-in center, comprising:

    a plurality of agent stations, individual ones of the agent stations having a telephone and a computer workstation including a video display unit (VDU), the telephone and computer workstation connected by a data link;

    a local area network (LAN) connecting at least some of the computer workstations at the agent stations; and

    a first computer processor including an instance of a telephony server (T-Server), the computer processor connected on the LAN and

having access to a database;

wherein the computer workstation is adapted to retrieve origination data for incoming calls at the telephone, and to use the origination data to correlate the caller with further data retrieved from

5   the database for display on the VDU.

17. The telephony call-in center of claim 16 wherein the T-Server is adapted to service calls from specific Service Control Points (SCPs) and to block display of data at agent station VDUs for any call not identified

10   as originating at one of the specific SCPs.

18. The telephony call-in center of claim 16 wherein one or more of the computer workstations are personal computers (PCs).

15

19. The telephony call-in center of claim 16 wherein the communication link between telephones and computer workstations is a PC-compatible serial data link.

20   20. The telephony call-in center of claim 16 wherein the computer workstation is adapted to report the origination data to the T-Server, and the T-Server is adapted to correlate the caller with further data retrieved from the database for display on the VDU.

25   21. A telephone call-routing system, comprising:

a call-in center comprising a plurality of agent stations, individual ones of the agent stations having a telephone and a computer workstation including a video display unit (VDU) connected by a communication link, with a plurality of the computer workstations

30   connected to one another, to a first processor running an instance of a telephony server (T-Server), ad to a database on a local area network (LAN); and

a call-routing center comprising a telephony switch adapted to switch telephone calls to the telephones at the call-in center, the telephony switch coupled to a second processor running an instance of the T-Server;

wherein the computer workstation is adapted to retrieve origination data for incoming calls at the telephone and to report the origination data to the T-Server, and wherein the T-Server is adapted to use the origination data to correlate the caller with further data retrieved from the database for display on the VDU.

22. The telephone call-routing system of claim 21 wherein the T-Server is adapted to service calls from specific Service Control Points (SCPs) and to block display of data at agent station VDUs for any call not identified as originating at one of the specific SCPs.

23. The telephone call-routing system of claim 21 wherein one or more of the computer workstations are personal computers (PCs).

24. The telephone call-routing system of claim 21 wherein the communication link between telephones and computer workstations is a PC-compatible serial data link.

25. The telephone call-routing system of claim 21 further comprising a computer telephony integration (CTI) link between the first processor and the telephony switch.

26. An agent station for a call-in center, comprising:

a computer workstation having a first communication port and a local area network (LAN) adapter;

a telephone having a telephone line port and a second communication port; and

a communication link connecting the computer workstation and
the telephone between the first and the second communication ports;
wherein the computer workstation is adapted to retrieve
origination data for calls to the connected telephone via the
5   communication link, and to report the origination data on a LAN via the
LAN adapter.

27. The agent station of claim 26 wherein the computer workstation is a
personal computer (PC) having a video display unit (VDU).

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28. The agent station of claim 26 wherein the communication link is a
PC-compatible serial data link.

29. A method for correlating displayed data with incoming calls at a
15   call-in center, comprising steps of:
        (a) connecting individual telephones at the call-in center by a
communication link to individual computer workstations;
        (b) connecting each telephone-connected computer workstation
on a local area network (LAN) to a processor connected on the LAN and
20   running a telephony server (T-Server) having access to a database
storing data to be displayed;
        (c) monitoring origination information of incoming calls by the
computer workstations;
        (d) providing the origination information over the LAN to the T-
25   Server running on the LAN-connected processor; and
        (e) using the origination information via the T-Server to correlate
data to be displayed with the incoming calls.

30. The method of claim 29 wherein the computer workstation in step
30   (a) is a personal computer (PC) and the communication link is a PC-
compatible serial data link.

31. A telephony call-in center, comprising:

a plurality of agent stations, individual ones of the agent stations having a telephone and a computer workstation, the telephone and computer workstation connected by a communication link;

a local area network (LAN) connecting at least some of the computer workstations at the agent stations; and

a first computer processor including an instance of a telephony server (T-Server), the computer processor connected on the LAN and having access to a database;

wherein the computer workstation and telephone are adapted to share voice data over the communication link

32. The telephony call-in center of claim 31 wherein the computer workstation is adapted to cause to be recorded at least portions of the voice data of telephone calls at the telephone connected to the workstation by the data link.

33. The telephony call-in center of claim 32 wherein the computer workstation transmit an audio version of the telephone call on the LAN to be recorded in a database connected to the LAN.

34. The telephony call-in center of claim 32 wherein call recording is managed by the T-Server.

35. The telephony call-in center of claim 32 wherein an input interface is presented at the computer workstation, adapted for an agent to control recording of portions of telephone calls on a telephone connected to the computer workstation.

36. The telephony call-in center of claim 31 wherein the computer workstation is adapted to cause pre-recorded audio data to be played to a

caller at the telephone connected to the computer workstation by data link.

37. The telephony call-in center of claim 36 wherein the pre-recorded audio data played to a caller is under agent control.

38. The telephony call-in center of claim 31 wherein the computer workstation is enhanced by a voice-recognition system adapted to respond to voice data retrieved from the telephone connected to the computer workstation by the data link.

39. The telephony call-in center of claim 38 wherein the computer workstation as adapted to respond to voice commands spoken by an agent at the connected telephone.

40. The telephony call-in center of claim 38 wherein the computer workstation is adapted to respond to specific words and phrases uttered by a caller in a call at the connected telephone with pre-recorded audio phrases.

41. An agent station for a call-in center, comprising:
   a computer workstation having a first communication port;
   a telephone having a telephone line port and a second communication port; and
   a communication link connecting the computer workstation and the telephone between the first and the second communication ports;
   wherein the computer workstation and telephone are adapted to share voice data over the data link.

42. The agent station of claim 41 wherein the computer workstation is adapted to cause to be recorded at least portions of the voice data of telephone calls at the telephone connected to the workstation by the data

link.

43. The agent station of claim 42 wherein an input interface is presented
at the computer workstation, adapted for an agent to control recording of
5   portions of telephone calls on a telephone connected to the computer
workstation.

44. The agent station of claim 41 wherein the computer workstation is
adapted to cause pre-recorded audio data to be played to a caller at the
10   telephone connected to the computer workstation by data link.

45. The agent station of claim 44 wherein the pre-recorded audio data
played to a caller is under agent control.

15   46. The agent station of claim 41 wherein the computer workstation is
enhanced by a voice-recognition system adapted to respond to voice data
retrieved from the telephone connected to the computer workstation by
the data link.

20   47. The agent station of claim 46 wherein the computer workstation as
adapted to respond to voice commands spoken by an agent at the
connected telephone.

48. The agent station of claim 46 wherein the computer workstation is
25   adapted to respond to specific words and phrases uttered by a caller in a
call at the connected telephone with pre-recorded audio phrases.

49. A method for providing voice extensions at a call-in center,
comprising steps of:
30   (a) connecting individual telephones at the call-in center by a
communication link to individual computer workstations;

(b) adapting the computer workstations and connected telephones to share digital audio data over the connecting communication link; and

(c) adapting the computer workstation to provide voice extensions.

50. The method of claim 49 wherein the voice extensions include one or more of call recording, playback of pre-recorded voice files to the telephone during a telephone call, and voice-activated functions.
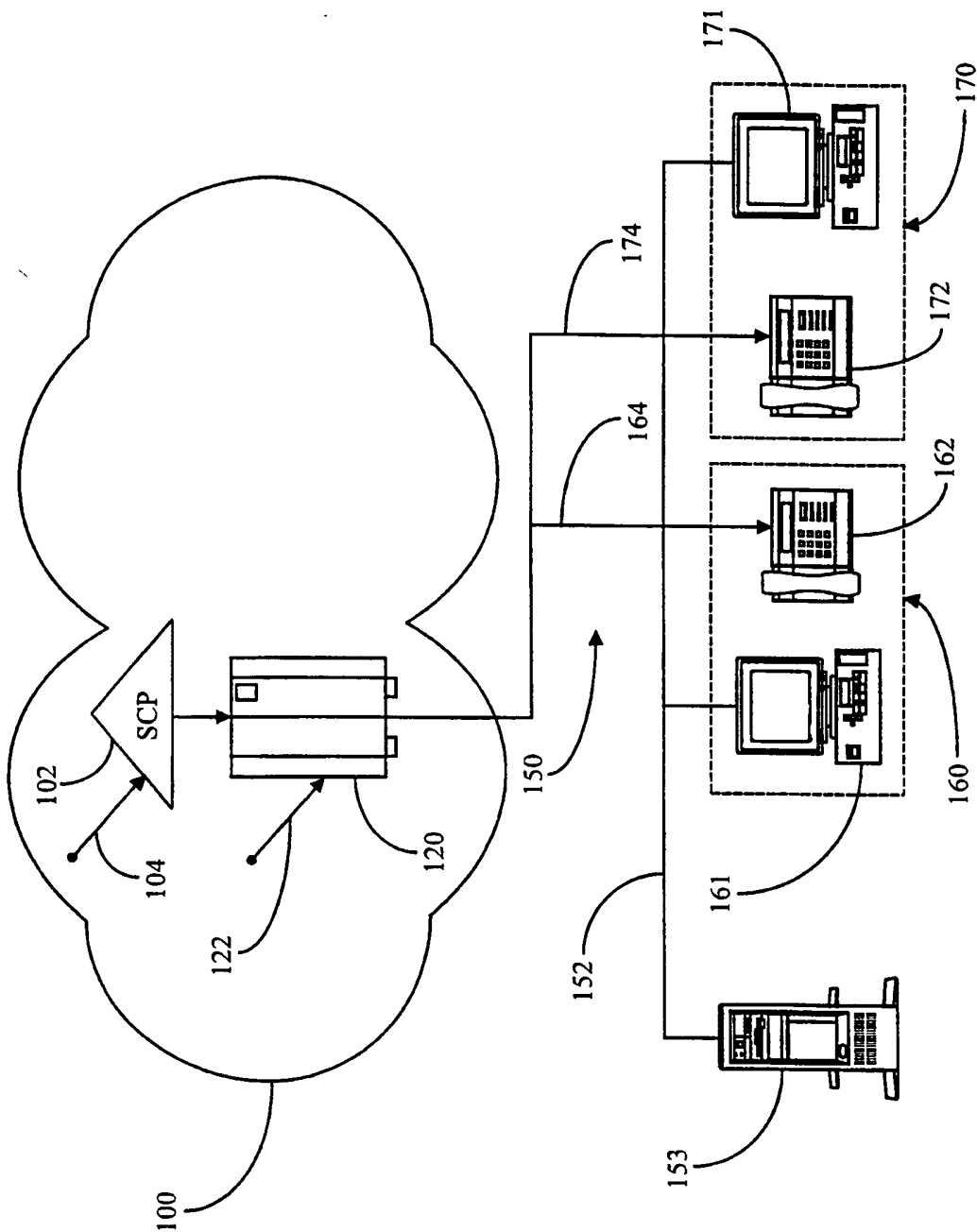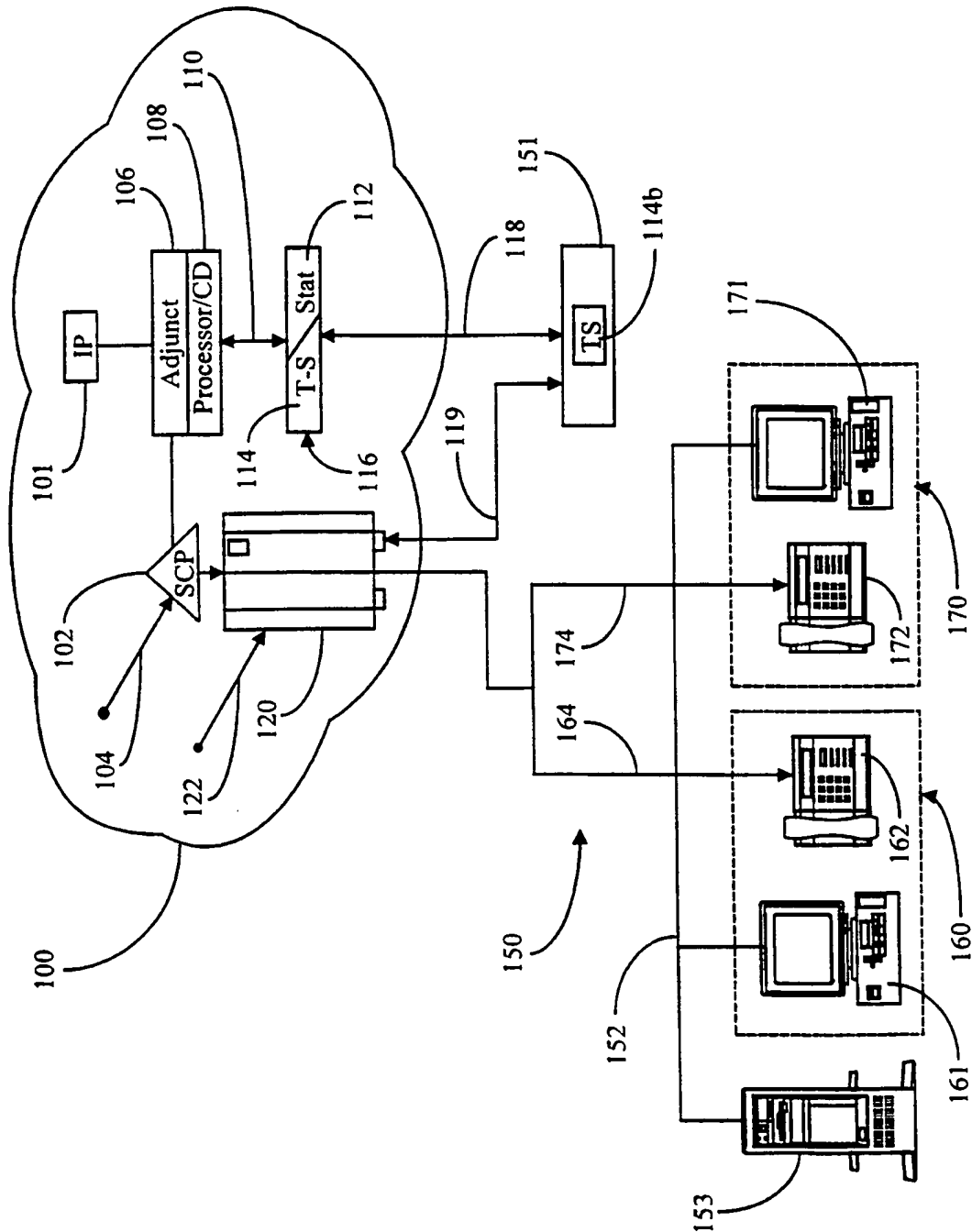
Fig. 1 (Prior Art)

Fig. 2
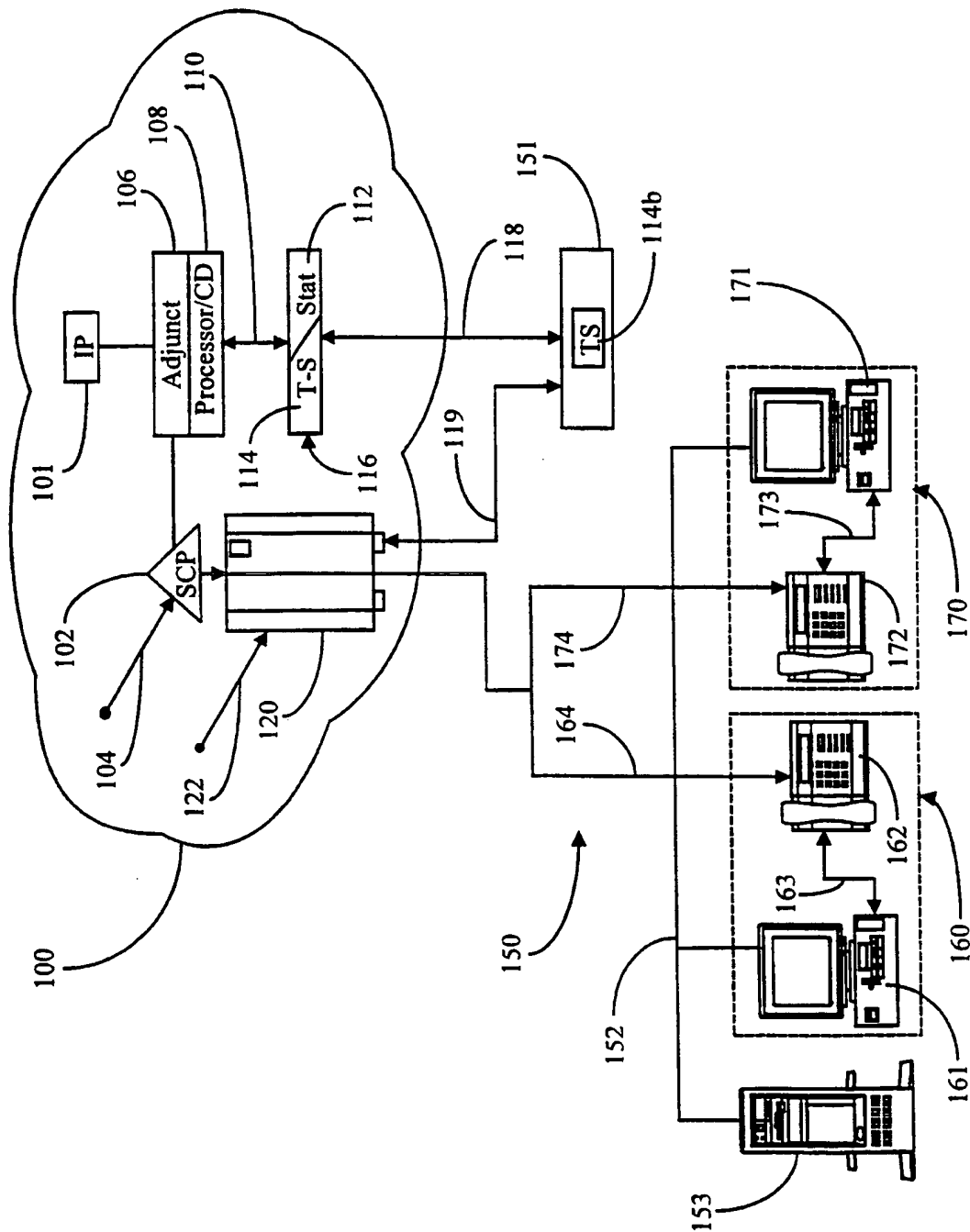
Fig. 3

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :H04M 1/64, 3/42, 3/00.
US CL : 379/67,88,89,210,212,265
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/67,88,89,210,212,265

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

aps

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US Patent 5,036,535 A (GECHTER ET AL.) 30 June 1991, Col. 1, line 40 through Col. 3, line 68 and Col. 18, lines 15-33.	1-20
X,P	US Patent 5,621,789 A (McCALMONT ET AL.) 15 April 1997, Figures 1-2 and Col.11, line 65 through Col. 14, line 13.	1-20
X	US 5,555,299 A (MALONEY ET AL.) 10 September 1996, Figures 1-2 and Col. 4, line 35 through Col. 6, line 35.	1,11,19
A	US 5,742,675 A (KILANDER ET AL.) 21 April 1998, Col. 1, line 53 through Col. 3, line 45 and Figure 1.	1-20

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		
		"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 JUNE 1998	01 SEP 1998
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer ALLAN HOOSAIN
Facsimile No. (703) 305-3230	Telephone No. (703) 305-4012

Form PCT/ISA/210 (second sheet)(July 1992)*

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,757,904 A (ANDERSON) 26 May 1998, Figure 1 and Col. 1, line 5 through Col. 3, line 17.	1-20